REMARKS

This Amendment is submitted in response to the Office Action mailed on February 13, 2006. Claims 1 - 20 are pending, with claims 6, 8, and 15 allowable if re-written in independent form, and the remaining claims rejected at present.

Claims 6, 8, and 15 have been so re-written. Amendments to claims 1 and 2 correct obvious typographical errors.

A Fee Transmittal is enclosed for added independent claims.

RESPONSE TO OBVIOUSNESS REJECTION OF CLAIMS 1, 3, and 4

These claims were rejected as obvious, based on Fong and Dauvergne.

Point 1

The Office Action cites Fong as showing an igniter, and the Office Action adds Fong's igniter to Dauvergne. However, Dauvergne shows his own igniter 37 in his Figure 1 (column 5, line 10).

A teaching is required for substituting Fong's igniter for that in Dauvergne. No teaching has been provided.

Point 2

Claim 1 recites:

> 1. Apparatus for sensing spark in an igniter in a gas turbine engine, comprising:

> a) a holder into which the igniter is inserted;
>
> b) a coil mounted in the holder; and
>
> c) a detector for detecting current in the coil.

Applicants point out that claim 1(a) recites "a holder into which the igniter is inserted." The only possible "holder" in Fong is cylinder 10 in his Figure 1.

But claim 1(b) recites "a coil mounted **in** the holder." There is no such coil "mounted **in** the holder" in Fong.

Therefore, even if the references are combined, claim 1 is not attained. The claimed "coil mounted **in** the holder" is not present. MPEP § 2143.03 states:

> To establish prima facie obviousness . . . **all the claim limitations** must be taught or suggested by the prior art.

Point 3

The rationale used for combining the references merely states that the igniter of Fong should be added to Dauvergne. But the rationale does not state that the coil 4 of Dauvergne should be added.

Therefore, the rationale does not lead to claim 1. The rationale does not state that the coil 4 of Fong should be added to Dauvergne. Thus, claim 1 recites a "coil," but any "coil" is

missing from the references, as combined.

Point 4

No teaching has been given in support of combining the references. The only rationale given is that ignition is required in gas turbine engines, and Fong shows an igniter.

However, this rationale ignores the fact that Dauvergne shows his own igniter 37 in his Figure 1.

Thus, the problem of ignition has been solved by Dauvergne, so no need exists for Fong's igniter. Since no other rationale has been given, no teaching has been provided for combining the references.

MPEP § 706.02(j) states:

> Contents of a 35 U.S.C. 103 Rejection
>
> . . .
>
> To establish a prima facie case of obviousness, three basic criteria must be met.
>
> First, there must be some **suggestion or motivation**, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.
>
> . . .
>
> The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure.

The preceding applies to claims 3 and 4.

RESPONSE TO OBVIOUSNESS REJECTION OF CLAIM 7

Claim 7 was rejected as obvious, based on Fong, Dauvergne, and Warner. Claim 7 recites:

> 7. Apparatus according to claim 1, wherein part of the igniter forms a core of the coil.

Point 1

The "coil" in Warner is element 35 in his Figure 2. (Column 4, line 47 et seq.) The only possible "igniter" in that Figure is spark plug 10. That spark plug 10 clearly does not form a "core" of the coil, as claimed.

Thus, even if the references are combined, this element is missing.

Point 2

The coil 35 in Warner is actually the transformer which steps up voltage, to allow the spark plug to fire. (Column 3, top.) That transformer 35 contains two coils: a primary and a secondary.

Transformers are designed so that the magnetic coupling between the primary and secondary is maximal. One way of achieving maximal coupling is to wrap the primary and the secondary around

a common iron ring. For example, the primary can be wrapped between the 8 and 10 o'clock positions, and the secondary wrapped between the 2 and 4 o'clock positions.

Alternately, the primary and the secondary can be wrapped coaxially, around a common iron rod. Other approaches are probably possible.

The iron ring or rod forms the "core," and carries the magnetic field.

The claim states that **part of the igniter forms a core** of the coil. In this connection, Applicants submit that the PTO has shown no expectation of success in the combination of references.

> -- the PTO asserts that an igniter in the references forms part of the "core,"
>
> -- but the PTO has not shown how that "core" acts effectively to carry the magnetic field required by the secondary of Warner's transformer 35.

Restated, if the "igniter" in Warner is to act as a "core" as claimed, then it must be part of the magnetic circuit of transformer 35. The PTO has not shown how that is possible. No expectation of success has been shown.

MPEP § 706.02(j) states:

> Contents of a 35 U.S.C. 103 Rejection

> . . .
>
> To establish a prima facie case of obviousness, three basic criteria must be met.
>
> . . .
>
> Second, there must be a **reasonable expectation of success**.
>
> . . .
>
> The . . . reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure.

Applicants point out that a showing of an expectation of success is required, at least because Applicants' invention does not use the coil to power the igniter.

Point 3

Point 2 applies to Fong, whose coil 4 is also a transformer.

Point 4

Warner, as interpreted by the PTO, is contradictory to Fong. Contradictory references cannot be combined.

There is no indication in Fong that his coil 4 has a "core" which is part of an igniter as claimed. But the PTO cites Warner as showing such a core. Thus, Warner, as interpreted by the PTO, is contrary to Fong.

Contrary references cannot be combined.

From another point of view, Fong can be cited for the proposition that the claimed core should be absent. Thus, a line of reasoning must be presented which overcomes this proporition.

RESPONSE TO OBVIOUSNESS REJECTION OF CLAIM 2

Claim 2 was rejected as obvious, based on Fong, Dauvergne, and DeFreitas. Claim 2 recites:

> 2. Apparatus according to claim 1, wherein said holder reaches a temperature of 175 F or greater during normal operation of the engine.

Point 1

MPEP § 2143.03 states:

> To establish prima facie obviousness . . . **all the claim limitations** must be taught or suggested by the prior art.

In giving a reason for combining the references, the Office Action asserts that it is obvious to add a "holder for igniter capable of withstanding 175° F."

However, no such "holder" has been shown in the prior art. DeFreitas, which is cited as showing the high-temperature condition, does not show a "holder" for an "igniter" as recited in parent claim 1.

Stated more precisely, Applicants are asserting that the claim

element is a "holder" having the recited temperature capability. No such "holder," which performs the claimed functions, and which has the recited temperature capability, has been shown in the prior art. Thus, this claim element is missing from the references, even if combined.

Point 2

Applicants submit that no valid teaching for combining the references has been given. The rationale given is that, since DeFreitas teaches that the igniter reaches the claimed temperature (this is the premise), the claimed "holder" should be added to the other two references (this is the conclusion).

However, the conclusion does not follow, as a matter of logic, from the premise. One reason is that both Fong and Dauvergne are presumed to be operable as they stand. Even if DeFreitas indicates that Fong and Dauvergne reach the temperatures of DeFreitas, nevertheless, why is the claimed "holder" necessary in Fong and DeFreitas ? The operate without it.

A second reason is that, again, no "holder" which performs the claimed functions has been shown in the prior art.

RESPONSE TO OBVIOUSNESS REJECTION OF CLAIM 5

Claim 5 was rejected as obvious, based on Fong, Dauvergne, DeFreitas, and Owens. Claim 5 recites:

5. Apparatus according to claim 2, wherein no electrical current passing through the igniter enters the coil.

Point 1

The Office Action relied on coil 4 in Fong to show the "coil" in parent claim 1. The coil 4 in Fong is a transformer. (Column 4, lines 56 - 67.) Fong applies a time-changing voltage to the primary of the transformer, which generates a time-changing current in the primary. The time-changing current creates a time-changing magnetic field, which induces a time-changing voltage in the secondary of the transformer.

The time-changing voltage is applied to the spark plug in Fong, and the current flows from the secondary through the spark plug, to ground.

Therefore, in Fong, a current flows through the coil, and into the spark plug. That is directly contrary to claim 5.

Point 2

The Office Action has only shown a coil in Owens which carries no current which passes through an igniter in Owens. However, the Office Action has not shown that this coil corresponds to the claimed "coil."

Point 3

The Office Action asserts that the coil of Owens should replace the coil(s) found in the other three references.

However, that entails removing the coil 4 of Fong. That renders Fong inoperative. MPEP § 2143.01, section 5, states:

> The proposed modification cannot render the prior art unsatisfactory for its intended purpose.

Thus, the modification of Fong is inconsistent with this MPEP section.

Point 4

If the other three references are modified as the Office Action suggests, then the PTO must show how parent claim 1 is found in the references, as now combined.

That is, the PTO combined the references in a particular way, in an attempt to show claim 1. Now the references are combined in a **different** way, because the coil of Owens replaces that of Fong.

Since the coil of Fong was used to show parent claim 1, and that coil is no longer being used, claim 1 must be shown in the newly applied references.

That has not been done.

Point 5

Owens contradicts parent claim 1, and thus teaches away from the invention.

Claim 1 recites:

> a) a holder into which the igniter is inserted;
>
> b) a coil mounted in the holder.

Thus, the same "holder" holds both

1) the coil and

2) the igniter.

Owens' Figure 1 shows coil 30 as being remote from the igniter. That teaches away from claim 1.

It is true that Owens, column 3, lines 49 - 52, states that his detector 10 can sense current "at the igniter itself." However, that does not state that his coil 30 is in a common holder with the igniter.

And even if he did say that, a teaching is required for selecting that proposal, over the other proposed locations where Owens states that his coil 30 can be located.

No such teaching has been given.

Point 6

No valid teaching has been given for combining the references.

The rationale is that the sensor is protected from high ignition currents. However, several problems are found in this rationale.

Problem 1

If such protection is the goal of the combination of references, then that goal can be attained without producing claim 5. For example, Owens' coil 30 can be placed adjacent a spark plug wire in Fong. The goal is attained, but claim 5 is not attained, because spark plug current passes through Fong's coil 4.

Problem 2

If such protection is the goal of the combination of references, then that goal can be attained by Owens himself. No combination with other references is needed. Thus, the goal does not, as a matter of logic, lead to a combination with other references to produce the claim.

Problem 3

The rationale merely sets forth a supposed characteristic of the references, once combined. That is not a teaching for making the combination in the first place.

One reason is that the law requires a teaching for combining references. If the PTO can merely rely on a characteristic of

combined references as the teaching, then the requirement becomes meaningless. It's meaningless because **every** combination of references will have some characteristic. Thus, a teaching could be found for **every** combination of references, making every invention obvious.

Problem 4

The undersigned attorney, when a university student, owned either an engine timing light or a tachometer, which detected spark singals by a direct connection with the spark plug wire. The device was attached by

-- removing a spark plug wire from a spark plug,

-- pressing one end of cylindrical coiled spring onto the spark plug (the tip of the spark plug entered the hollow of the spring),

-- re-attaching the spark plug wire, but to the other end of the spring, and

-- attaching an alligator clip to the spring.

No problem was seen in operating this device.

Therefore, Applicants submit that this example illustrates that a fear of "high ignition currents" is non-existent. Therefore, the PTO's goal of sensing spark inductively, to avoid such currents, would not be sought by the person skilled-in-the-

art.

RESPONSE TO OBVIOUSNESS REJECTION OF CLAIM 9

Claim 9 was rejected as obvious, based on Angell and Owens.

Claim 9 recites:

> 9. Apparatus for attaching an igniter to a gas turbine engine, comprising:
>
> a) a base containing a threaded bore, into which bore the igniter can be threaded;
>
> b) holes in the base through which fasteners can fasten the base to the engine; and
>
> c) a coil affixed to the base, for detecting currents in the igniter.

Point 1

Applicants submitthat no valid teaching has been given which leads to the claimed invention.

The rationale given is that adding the coil of Owens allows measurement of igniter current at the igniter itself. However, that rationale does not lead to the claimed invention.

-- The coil can be placed upstream of nut 133 in Angell's Figure 2.

-- An attempt can be made to place the coil along body 120 of the igniter, if the body is non-conductive, or has openings.

-- The coil could be placed **inside** the body

120.

In either case, the coil is not "affixed to the base" as claimed. Thus, the goal of measuring current at the igniter can be attained in other ways. That goal does not lead to the claimed invention.

Point 2

The goal of the PTO's rationale is to sense "current at the igniter itself." That goal, as part of the rationale for combining the references, has not been shown in the prior art. Since the only other source of that goal is Applicants' Specification, it is reasonable to assume that the goal was taken from the Specification.

MPEP § 706.02(j) states:

> Contents of a 35 U.S.C. 103 Rejection
>
> . . . the examiner should set forth in the Office action:
>
> . . .
>
> (C) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and
>
> (D) an **explanation** why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification.
>
> To establish a prima facie case of

> obviousness, three basic criteria must be met.
>
> First, there must be **some suggestion or motivation**, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.
>
> . . .
>
> The teaching or suggestion to make the claimed combination and the reasonable expectation of success **must both be found in the prior art and not based on applicant's disclosure**.

Applicants submit that compliance with this MPEP section requires a showing of the goal in the prior art.

Point 3

The igniter of Angell plainly is surrounded by a metallic case, from the male thread at the left end to the tip at the right end.

Under classical principles, explained partly in the Specification, paragraph 88 et seq., that metallic case will act as a shield, and prevent Owen's coil from detecting currents within the case. Also, under classical thinking, the return current from the igniter is believed to travel along the metallic case. Thus, the **net** current within the metallic case is zero.

Owen's coil would detect nothing.

Therefore, the ordinary person skilled in the art would not

expect Owens' coil to detect current, if placed adjacent Angell's igniter.

Prior to filing the present application, Applicants surmised that the return current may not all follow the casing of the igniter. (See Specification, paragraph 95.) Applicants performed a test, and found that current could, in fact, be detected, perhaps for that reason, or for other reasons.

Therefore, again, the ordinary person skilled in the art would not expect Owens' coil to detect current, if placed adjacent Angell's igniter.

Point 4

Applicants submit that the rejection is inconsistent with the "obvious to try" rationale of the law of patents.

MPEP § 2145, section X, states:

> B. Obvious To Try Rationale
>
> An applicant may argue the examiner is applying an improper "obvious to try" rationale in support of an obviousness rejection.
>
> The admonition that "obvious to try" is not the standard under Section 103 has been directed mainly at two kinds of error.
>
> In some cases, what would have been "obvious to try" would have been to vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication

> of which parameters were critical or no direction as to which of many possible choices is likely to be successful.
> . . .
> In others, what was "obvious to try" was to explore a new technology or general approach that seemed to be a promising field of experimentation, where the prior art gave only general guidance as to the particular form of the claimed invention or how to achieve it.

Applicants submit that the PTO is applying the latter type of "obvious to try" reasoning.

Applicants were aware of much of the conventional wisdom, which stated that an inductive pick-up would not detect current within the metallic housing of the igniter, because of (1) shielding, (2) the supposed net zero current, and (3) other factors.

Nevertheless, Applicants performed an experiment, and found that it worked.

The "obvious-to-try" principle applies here: Applicants should be entitled to a patent on the results of their experiment.

RESPONSE TO OBVIOUSNESS REJECTION OF CLAIMS 10 AND 11

These claims were rejected as obvious, based on Angell, Owens, and Skerritt. Claim 10 recites:

> 10. (Original) Apparatus for attachment to an igniter for a gas turbine engine, the igniter having (1) a proximal end, (2) a casing at the proximal end, the casing having

> a cross sectional shape S, and (3) an electrical connector at the proximal end, the apparatus comprising:
>
> a) a housing having an internal aperture matching shape S, so that the housing fits about the proximal end;
>
> b) within the housing,
>
> i) an inductive pick-up, and
>
> ii) an amplifier which amplifies signals produced by the pick-up.

Point 1

Applicants submit that the combination of references is inoperative.

The Office Action relies on Skerritt's amplifier 33 to show the claimed amplifier. However, that amplifier 33 is a bandpass amplifier. (Column 2, line 26.) Skerritt states:

> [Amplifier 33 provides] an output pulse on a line 34 in response only to signals in the region of 66 - 69 KHz.
>
> (Column 2, lines 26 - 28.)

Thus, Skerritt's amplifier 33, even if combined with Angell, only produces a signal if the frequencies between 66 and 69 KHz are present, and then only if the signals are detected through the metal casing of Angell's apparatus, as discussed below.

Applicants submit that the combination is inoperative. No signals in that frequency range have been shown in the other

references.

From another point of view, no expectation of success has been shown, as required by MPEP § 706.02(j).

Point 2

The claim states that the "inductive pick-up" is "within the housing." The Office Action relies on element 130 in Angell's Figure 2 to show the "housing."

However, there is no way to place Owen's detector 10 "within" element 130 in Angell.

Nor has the Office Action explained how that would be done.

Therefore, this claim recitation is missing, even if the references are combined.

From another point of view, no expectation of success has been shown. The Office Action has not shown how the claimed invention is attained, by combining the references.

Point 3

Applicants submit that no valid teaching has been given for combining the references.

The stated goal is to pick up an ignition signal inductively, and to amplify it. However, Owens, by himself, does that. His wire 30 is an inductive pick-up. He states that a 17-volt signal is produced as Vsense. (Column 4, line 16.) That shows current-

to-voltage amplification. (The spark current is the input, and Vsense is the output. The gain is Vsense/current.)

Or, from another point of view, Applicants submit that Owens' 17-volt signal (Vsense) is sufficiently large that it needs no amplification. In paragraph 0168 of Applicants' Specification, it is stated that a 250 millivolt signal is commonly treated as a detectable signal. Owens' signal clearly exceeds that. Thus, there is no need to further amplify Owens' existing Vsense.

Therefore, there is no need to combine Owens with the other references to attain the stated goal. Consequently, Applicants submit that the stated goal does not lead, as a matter of logic, to the claimed invention.

Point 4

The claim states that the "amplifier" is "within the housing." The PTO has not shown how Skerritt's amplifier 33 can be placed within the element 130 in Angell, which is cited as the housing.

Also, element 130 in Angell is adjacent the combustor in a gas turbine engine. It is well known that the gas temperature in the combustor exceeds the melting temperature of the metal of which the combustor is constructed, which explains why cooling air films are constantly blown onto the combustor in practice.

Thus, Skerritt's amplifier 33, in being a solid-state device, cannot survive the temperature of element 130.

For both these reasons, Applicants submit that no expectation of success has been shown.

Claim 11

Claim 11 stands or falls with parent claim 10.

RESPONSE TO OBVIOUSNESS REJECTION OF CLAIMS 12 - 14

These claims were rejected as obvious, based on Angell, Owens, Skerritt, and Maris. Claim 12 recites:

> 12. (Original) Apparatus according to claim 10, wherein the amplifier comprises an RLC amplifying circuit.

Point 1

Applicants submit that the Office Action is self-contradictory. Previously, the Office Action cited Skerritt's amplifier 33 to show the claimed "amplifier." Now the Office Action cites an RLC amplifier in Maris to show that amplifier.

The same amplifier must be used to show the same amplifier in a parent claim and a dependent claim.

Point 2

If the PTO is asserting that the RLC amplifier of Maris is being added to the amplifier 33 of Skerritt, then Applicants submit that the PTO must explain how the combination is made. Otherwise,

no expectation of success has been shown.

Point 3

Maris states that his RLC circuit is driven by a sinusoidal current.

There is no such current in the igniter of Angell to drive the RLC circuit of Maris.

As Applicants explain in the Specification, paragraph 106 et seq., the prior art states that an RLC amplifier requires sinusoidal steady state excitation. However, Applicants performed an experiment, and found that amplification can also be attained using pulsed excitation, such as that found in an igniter.

The teaching that the pulsed excitation of an igniter can be used for an RLC amplifier is only found in Applicants' Specification, and has not been shown in the prior art.

Thus, Applicants submit that their Specification is being used as a teaching for modifying the references. This is prohibited by MPEP § 706.02(j).

Point 4

Applicants submit that no valid teaching has been given for combining the references.

The rationale is that addition of the RLC circuit of Maris to the other references serves to correct output signal amplitude

(changes) due to impedence drift caused by temperature changes.

However, no such impedence drift has been shown in the other references. Thus, there is no need for the addition of the RLC circuit.

Further, the correction of impedence drift which Maris implements requires the cooperation of inductor 26 and amplifier 28. (Column 6, lines 43 - 51.) No teaching has been given for addition of amplifier 28 to the combination of references, nor an expectation of success in such addition.

Claim 13 recites:

> 13. (Original) Apparatus according to claim 12, wherein the igniter is powered by non-sinusoidal voltage pulses of frequency F, with each pulse having a duration D, and the RLC resonant circuit is resonant to sinusoidal steady-state excitation of a frequency 1/2D.

To show this claim, a "voltage pulse" of duration D must be shown in Angell's igniter, and the RLC circuit of Maris must be resonant at a frequency of 1/2D, wherein D is the duration just identified.

That has not been shown.

Claim 14 states that the pulses are triangular. No triangular pulse has been shown in the references.

The Office Action asserts that it would be obvious to use

triangular pulses. However, Applicants point out that "obviousness" is not a vehicle for supplying claim elements which are not shown in the prior art.

Section 103 states that the question of obviousness is the question of whether "differences between the subject matter sought to be patented and the prior art" are "obvious."

Thus, the triangular waveforms must be shown in the prior art.

MPEP § 2143.03 states:

> To establish prima facie obviousness . . . **all the claim limitations** must be taught or suggested by the prior art.

RESPONSE TO OBVIOUSNESS REJECTION OF CLAIMS 16, 17, AND 20

These claims were rejected as obvious, based on Owens and Skerritt.

Claim 16

Claim 16 recites:

16. (Original) Apparatus, comprising:

a) an igniter for a gas turbine engine;

b) an inductive pick-up adjacent the igniter; and

c) an amplifier having no active elements, which amplifies signals produced by the pick-up.

Point 1

Applicants point to claim 16(c), which states that the amplifier has "no active elements." Skerritt is cited as showing the claimed amplifier. However, Skerritt is directly contrary to the recitation of "no active elements." Skerritt's amplifier 33 contains active elements, such as transistors.

Thus, the recitation of "no active elements" has not been shown in the applied references.

Point 2

The rationale for combining the references is contradictory to Skerritt. The rationale states that it is obvious to use no active elements. If that is done, then the Skerritt reference cannot be used.

The rationale defeats the rejection. Both the rationale and the Skerritt reference cannot be used together.

Point 3

No expectation of success has been shown. The Office Action has shown no amplifier, lacking active elements, which performs amplification as recited in the claim.

Claims 17 and 20

The preceding applies to claims 17 and 20.

RESPONSE TO REJECTION OF CLAIMS 18 AND 19

Claim 18

Maris is cited to show the claimed RLC circuit. However, as explained above, the rationale for adding Maris is that addition of the RLC circuit of Maris to the other references serves to correct output signal amplitude (changes) due to impedence drift caused by temperature changes.

However, no such impedence drift has been shown in the other references. Thus, there is no need for the addition of the RLC circuit.

Further, the correction of impedence drift which Maris implements requires the cooperation of inductor 26 and amplifier 28. (Column 6, lines 43 - 51.) No teaching has been given for addition of amplifier 28 to the combination of references, nor an expectation of success in such addition.

Claim 19

To show this claim, a "voltage pulse" of duration D must be shown in the references, and the RLC circuit of Maris must be resonant at a frequency of 1/2D, wherein D is the duration just identified.

That has not been shown.

13-DV-132638A
10/775,851
Art Unit 2858

Allowable Claims 6, 8, and 15

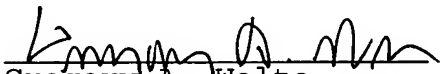
These claims have been re-written, to place them into condition for allowance.

Conclusion

Applicant requests that the rejections to the claims be reconsidered and withdrawn.

Applicant expresses thanks to the Examiner for the careful consideration given to this case.

Respectfully submitted,



Gregory A. Welte
Reg. No. 30,434

806 North County Road 700 West
Frankfort, IN 46041
(765) 296 - 4699
March 28, 2006

ATTACHMENT: Fee Transmittal